Vaccination

Student Worksheet

The following answers are based on pages 36 and 37:

1. Viruses and bacteria sometimes cause disease in man, but if they can be grown in a laboratory they can be used to make vaccines. Write down two ways in which these organisms can be altered so that they become harmless when administered as a vaccine:
   
   (i) Bacteria can be altered chemically, or only isolated parts of the microbe used.
   (ii) Viruses may be weakened by growing them in specific cultures.

2. Give three diseases that children can be vaccinated against:
   
   (i) Whooping cough.
   (ii) Diphtheria.
   (iii) Tetanus.
   
   Others: polio, measles, tuberculosis.

3. Which disease has been eradicated by the mass use of vaccination?
   
   Smallpox.

4. What are the next diseases that we hope to eradicate in the same way?
   
   Polio (by the year 2000) and measles.

5. Why is there no successful vaccine against the common cold?
   
   Colds are caused by hundreds of different viruses, each of which would require a specific vaccine.

6. Which white blood cells fight germs (or ‘pathogens’)?
   
   Lymphocytes.

7. What do these cells manufacture in order to fight the germs?
   
   Antibodies.
8. After your body has defended you against a particular germ, explain how you become immune to the disease caused by that germ in the future:

   A number of ‘memory’ lymphocytes retain the ‘blueprint’ of the antibody, so that if the germ invades again these defender cells are able to respond faster and more efficiently.

9. Using this information, describe how a vaccination works:

   Vaccines consist of harmless forms of the disease-causing microbe. When administered, they make the lymphocytes react as if they were fighting the real germ, by producing antibodies to it. Thus when the real germ attacks, the lymphocytes are already on alert and are able to respond before the germ causes any damage.

10. Give two reasons why many more people die from infectious diseases in poor countries than in rich countries:

    (i) Vaccinations to all diseases are not yet available in poorer parts of the world.
    (ii) Infectious microbes are more prevalent in poorer countries where the people suffer from bad hygiene, poor diets, etc.